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ZANZIBAR PROTECTORATE

ANNUAL REPORT

on the

DEPARTMENT OF AGRICULTURE

for the year ended 31st December, 1942.

SECTION I.

AGRICULTURE IN THE PROTECTORATE.

GENERAL.

The loss of Burma and the fall of the Dutch East Indies had important results on the economy of the Protectorate for the former country was a large supplier of rice and the latter the most important purchaser of the clove crop. Increased attention was given to the production of food crops in an endeavour to make the country as nearly self-supporting as possible. The Director of Agriculture continued to act as Food Controller and increased control over the distribution of imported food supplies was taken concurrently with increased pressure to plant more food crops. On the export side increased purchases of cloves by India and the United States of America assisted in a large measure to compensate, temporarily at least, for the elimination of the former market in the Dutch East Indies.

The price of copra was erratic during the early part of the year but an arrangement was made early in the second half of the year whereby the whole copra crop of the Protectorate was purchased by the United Kingdom Commercial Corporation, to the end of 1943, at prices of £16-10-0d. per ton f.o.b. for F.M.S. copra and £16-0-0d. for F.M. This resulted in bringing stability into the local copra market and internal prices for copra and coconuts became adjusted to these bases. The results have been satisfactory in that copra for export has come forward steadily and producers have become habituated to the idea that certain modest standards of preparation must be attained. It is clear that a purchasing agreement of longer duration with fixed prices for definite grades would provide the producer of copra with the incentive necessary to improve quality and to maintain standards. Grade standards for coconut oil were also determined and all consignments of coconut oil shipped overseas were duly certified.

THE WEATHER.

The rainfall of the year in the clove areas, which are also the principal rice and root crop growing areas, was slightly above that of 1941 but lower than average. Outside the plantation regions the year was a dry one and cultivations which had been extended to a marked extent suffered from lack of rain and low crop yields.

The period from January to March was moderately dry but showers kept early planted crops going. April and May were months of heavy rain and crops and seedlings planted in

March or earlier made good headway. The month of June was sunny with good showers but thereafter the weather was dry with strong drying south-east winds. The rice crop was good and ground crops planted in March developed well, but plantings from June onwards made little headway until the late rains of November and December which were, unfortunately, patchy in distribution and of short duration. Crops planted on the short rains were on the whole a failure.

THE MAIN CROPS.

Cloves.—The exports of the calendar year at 10,900 tons are considered satisfactory when account is taken of shipping difficulties and the loss of eastern markets. India took 47.5 per cent of the exports, North and South America 38.5 per cent, the United Kingdom and the continent 7.0 per cent and the remaining 7.0 per cent went to various destinations including Arabia, Australia and the Union of South Africa. The exports of clove oil for the year amounted to 450,143 lbs. the largest to-date.

The crop of the seasonal year 1942-43, which extends from 1st July, 1942 to 30th June, 1943, was a small one the bulk of which was produced in Pemba. Most of the crop was harvested by the end of 1942. As forecast in the last annual report the crop of the seasonal year 1941-42 was the second highest on record at 18,500 tons.

The prices declared by the Clove Growers Association for the purchase of cloves from producers in respect of the seasonal year 1942-43 were based on Fair Quality at Shs. 39.00 per 100 lbs. at the Zanzibar Depot of the Association. The declared price for clove stems was Shs. 9.00 per 100 lbs. Owing to the small crop demand was good and producers had no difficulty in disposing of new crop to exporters at prices substantially above the Association's declared buying prices. The price of cloves on the local market (ex duty) during the annual period averaged Shs. 52.03 per 100 lbs. compared with Shs. 36.05 in 1941.

Coconuts.—Approximately 12,900 tons of copra and 830 tons of coconut oil were exported during the year, the copra export having increased and the coconut oil export decreased. Expressed as copra the total production for export during the year was 14,200 tons compared with 12,500 tons in 1941. As a result of the operations of the internal control of production of coconut oil for soap making and for domestic consumption it is known that approximately 1,000 tons of copra were used in the Protectorate for these purposes during 1942 in addition to an unknown consumption of fresh coconuts.

The price of coconuts varied within wide limits in the early part of the year but became reasonably stable after the purchasing agreement with the Ministry of Food had had time to take effect. On the Government Plantations the average price of coconuts was Shs. 42-24 per thousand compared with Shs. 18-14 during 1941.

It is clear that the exporters of copra are passing on to the producer a fair share of the price which they are receiving for the product, and this factor, together with the absence of the competing claims of a large clove crop, has been responsible for the high production of the year.

The average price obtained for "Plantation" copra in 1942 was Shs. 13-54 per 100 lbs. or Shs. 4-74 per frasila. The average price for the previous year was Shs. 8-49 per 100 lbs. or Shs. 2-97 per frasila.

FOOD CROP PRODUCTION.

The year has been one of marked progress in the development of local food crop production towards a greater degree of self-sufficiency. In normal times Zanzibar lives on a predominantly cash economy importing its staple food in the form of large quantities of grains and pulses. At the beginning of the year people in the districts were still subsisting, to a great extent, upon imported foods but by the end they had gone a considerable way towards being self-supporting and notable quantities of country produce were arriving in the market of Zanzibar Town. The notes which follow form a brief record of the methods employed and the progress achieved in stimulating food growing.

The year opened with intensive propaganda by the Administrative and Agricultural Departments and the publication of the Defence (Land Requisition and Personal Services) Regulations which provided for the requisitioning of land required for food planting and the issue of an order to any able-bodied adult male between the ages of 18 and 45 years, who was not otherwise fully employed, to cultivate and plant an area up to 1½ acres. These orders were served by Government Officers, appointed as "Service Controllers", upon many persons who resided in the countryside but were not habitual cultivators.

In this first drive considerable attention was paid to people found spending their time in roadside coffee shops and there was a general attempt to get hold of the idler type. Plots of one acre size were generally given, and time limits for the completion of part of the work, and the whole of the work, were imposed. A check was kept upon these orders and those who grossly neglected to obey them were duly prosecuted. Any persons sentenced to imprisonment were housed and worked at a prison camp on the Experiment Station of the Department of Agriculture and this arrangement fitted in well with the general aims of the food planting campaign. The number of prosecutions necessary was very small; the summary prosecution of a few habitual idlers proving to be all that was necessary.

The issue of individual orders, intensive field propaganda and inspection of isolated plots gave good results but it became clear that the food planting drive could not achieve maximum results until the activities of the majority of the rural adult male population were capable of being checked and, in addition, the unemployed portion of the population of towns put to work on food plots.

In the initial campaign in the districts it was not possible to take any special action in regard to the large native population of Zanzibar Town. Thus, the town contained many people in casual employment or unemployed none of whom were cultivating, and was also a sanctuary to which those who wished to avoid the Service Controller could flee. People living in the country also complained that they had been made to cultivate but not town-dwellers. It was considered that if an effective job could be made of registration and the issue of cultivation orders to that section of the town population which was not fully employed many previous difficulties in the districts would disappear.

Accordingly, the next step was the complete registration of the adult male population of Zanzibar Town. This started at the beginning of June and as people came up for registration they were fully interrogated as to their occupation and means of livelihood. All those who could not satisfy the Registrar that they were in full-time employment were ordered to appear at a rendezvous in the town environs where suitable land had been requisitioned and marked into half-acre plots. During the space of two months over 2,000 unemployed or casually employed persons were thus given plots of land and issued with cultivation orders. Seed and plant material in the shape of cassava cuttings, sweet potato vines, maize and pulse seeds, were provided for the use of such persons.

The registration of the town population, undoubtedly, had an important effect in the districts. Now that the Town unemployed had been set to work those who had been disinclined to cultivate in the districts started to work of their own accord. The natural development from the town registration was to register adult males in certain selected country districts for the purpose of inspecting individual plots of ground crops and issuing orders to those who had not completed one acre of planting this season. Those who had completed at least one acre were issued with a "LIMA USHINDE" (= Dig for Victory) card which had for some months been in use by the Administration as a means of encouraging good cultivators.

The introduction of the method of registration in dealing with rural communities soon proved its worth in that accurate information as to the extent of planting in the various districts was obtained and, in the course of inspection, large numbers of cultivation orders were issued each day. This represented a marked advance on the "hit and miss" method of issuing isolated orders. The inclusion in the register of every adult male cultivator living in a country district rendered it increasingly difficult for the idler to evade the Cultivation Controller.

Propaganda, registration, and the inspection of ground crop planting occupied the period May to September. Accurate statistics for previous acreage under these crops do not exist but a large increase in the area planted to cassava and sweet potatoes over 1941 can be claimed confidently. This increase is due to a large extension of planting by the habitual cultivators and the inclusion of a large number of people, particularly young men, who had not previously cultivated their own food crops. The stimulus to increased planting was due to the improved methods of contact with individuals resulting from registration and also to the visible diminution in the supply of imported foods which brought home to country-dwellers the need to be self-supporting.

A useful development in the extension of sweet potato planting should be mentioned. In normal years sweet potatoes are grown as a cool season crop, maximum production being reached about October and November. When the roots are lifted the vines are usually thrown away or dry out completely in the hot sun. Hence, there is a perennial shortage of planting material in the early rains of each year. This is now being obviated by the planting of semi-permanent beds of sweet potatoes all along the main roads. The Public Works Department maintains a drain on the outer edge of the grass verges of the roads and when these drains are constructed or cleaned the soil is thrown on to banks. These banks, normally the site of tall grass and weeds, have been levelled into beds six feet wide all along the main roads and have been planted to sweet potatoes. When the roots are lifted fresh vines are immediately put in so that a permanent reserve of planting material is maintained. Early in 1942 it was difficult to obtain sweet potato cuttings to supply the cultivators of Zanzibar Town. As a result of the above measures, in which upwards of 50 miles of roadsides have been planted, it is possible for 1943 to contemplate a general order for sweet potato planting during the first rains.

Increasing difficulties in the supply of imported grains, particularly rice, rendered it most important that the maximum use should be made of the rice growing areas of the Protectorate. The last three months of the year were, therefore, occupied in a concerted and concentrated drive for the maximum planting of rice in the coming season. Legislation was introduced making it compulsory for all adult males in scheduled areas to appear for registration and the issue of orders. The original written order issued to individuals was replaced by a mass order which could be given to an assembled gathering. This greatly increased the effectiveness of the cultivation regulations whilst the compulsory registration of all adult males made it possible to maintain a complete check on the activities of all individuals in these areas. There was no difficulty whatever in persuading the great majority of the people to cultivate the requisite minimum area of half an acre of rice per person. After a trial in Zanzibar District these methods were introduced in Pemba District.

Between November and the end of the year the issue of orders to cultivators, registered specifically for rice cultivation, was in full swing and in some areas planting had already taken place. It is clear that the area being prepared for rice planting represents a substantial increase over that of the previous year and by means of the methods of registration which have been employed and the following up work of field units checking areas and progress an accurate assessment of rice acreage will be possible.

Considerable quantities of seeds and planting material were issued to cultivators and twenty-eight rice nurseries of approximately three-quarters of an acre each were planted at convenient centres in the rice areas to supply seedlings to those who required them. The plants were taken up with eagerness.

Pineapples.—The pineapple plantation at Selem was extended by increasing the planted area to 18 acres. Of the original area allocated to the Clove Growers Association there still remains approximately 1½ acres unplanted and this will be completed early in 1943. The fruiting in the

1942 season has, so far, been most disappointing and is attributable to the prolonged drought. By the end of the year, approximately two-thirds of the area was showing no sign of fruit. The whole of the area received an application of 2 cwts. of Sulphate of Ammonia per acre in August. Five acres of the new plantings received, in addition, a further 2 cwts. an acre in November.

Chillies.—Approximately 24 tons of graded chillies were exported compared with 15 tons last year. There was no local difficulty in disposing of the production as it came forward but import licences into consuming countries were not being obtained automatically.

DOMESTIC IMPORTS AND EXPORTS.

The imported foodstuffs of greatest importance to the Protectorate are grains (including wheat flour) and pulses. The total quantities of these which were imported and the declared values are shown for the years 1939 to 1942 inclusive. The statement reveals the marked falling off in the importation of these foods during 1942 and, equally important, the high value of the reduced quantity.

Year.	Imports. cwts.	Total Value Grains (including wheat flour) and Pulses. £
1939	599,624	240,229
1940	382,322	197,009
1941	403,496	234,451
1942	287,380	261,180

The table below shows the extent of the exports of domestic produce and reveals that the coconut industry has made an appreciable contribution to the income of the producer, the value of coconut products being some 22½ per cent of the value of the domestic exports in contrast to some 8 per cent in the preceding year. The total domestic exports of the land amounted to some 26,000 tons or, approximately, 2 cwts. per head of the population.

DOMESTIC EXPORTS.

Item	Unit	Quantity	1942	Per cent
			Declared of Total Value Value	Total Value
			£	
Cloves	... cwts.	218,362	767,302	66.83
Clove Stem Oil	... "	4,019	116,934	10.00
Copra	... "	258,240	219,501	20.00
Coconut Oil	... "	16,613	26,396	2.00
*Coconuts	... "	2,510	2,890	0.18
Oil Cakes	... "	14,947	2,732	0.18
Fresh Fruit	... "	—	6,614	0.54
Vegetables	... "	315	193	—
Tobacco	... "	478	638	—
Chillies	... "	477	1,564	0.09
Mangrove Bark	... "	6,440	1,457	0.09
		Total	522,401	
Ox Hides	... cwts.	368	1,128	0.09
Sheep and Goat Skins	Nos.	24,370	754	—
Total	...	—	1,148,103	100.00

*1,860,683 coconuts expressed approximately as copra.

SECTION II.

WORK OF THE DEPARTMENT OF AGRICULTURE.

GENERAL.

Experimental work and certain field investigations principally in connexion with the regeneration of clove plantations have been interfered with and delayed as a result of the secondment of officers to whole time duties arising out of war time conditions. Nevertheless some progress

can be noted, and the combined efforts of the Administration and the Department of Agriculture to stimulate increased food production and the wide interest which has been aroused amongst the people in this matter is one of the most important advances which falls to be recorded. Meetings of Agricultural Officers and supervisors with the people in the fields and villages have been frequent and well attended.

As was noted last year nurseries primarily established for the rearing of selected clove seedlings have been extended by the addition of food crop areas to provide planting material for distribution to cultivators. During the year 90,258 clove seedlings were distributed from nurseries in Zanzibar and 40,230 in Pemba, a total of 130,488 compared with 118,249 in 1941. Five new clove nurseries intended to produce 50,000 seedlings per year for free distribution to planters who will follow a systematic plan of regeneration of old clove areas were constructed from funds provided by the Clove Growers Association.

School gardens in Zanzibar were kept in good condition and instruction in agricultural science given by an Arab Assistant Agricultural Officer—a product of Makerere College. During the latter part of the year regular fortnightly visits were made to the Experiment Station at Kizimbani by the senior boys from the Rural Middle School at Dole. The subjects studied were of a practical rather than a theoretical nature and included poultry keeping, copra making, brick making, vegetative reproduction and orchard practice, levelling and bunding for rice, vegetable growing and compost making.

The production of rubber, principally from vines of *Landolphia* spp. which grow in limited areas of Pemba, was undertaken in view of the general shortage of rubber and prices were fixed for the commodity in order to stimulate production. The quality produced was good.

Organized composting of vegetable matter and waste from the dairies at Mtoni was instituted on a considerable scale. The compost will be used, amongst other purposes, for vegetable and food production. An extension of compost making in Pemba was also undertaken.

EXPERIMENT STATIONS.

Cloves.—As in previous years the greater part of the experimental work on the clove tree is in consequence of the "sudden death" condition which has brought about the death of large numbers of clove trees in the Protectorate. An investigation into the nature of "sudden death" was undertaken by Dr. A. H. Campbell in 1938 and arising out of his findings several associated problems are being examined.

A mulching experiment which was started in 1940 in order to see if the conservation of soil moisture by this means might check the incidence of "sudden death" was discontinued this year. It became quite clear that mulching does not arrest the tide of "sudden death" when it is encroaching upon a plantation. A related experiment on soil moisture has been started this year in which a block of healthy trees in a "sudden death" zone are being heavily watered during rainless periods. It remains to be seen if these watered trees do not succumb to "sudden death" as their neighbours are doing.

The effect of minor elements, either as deficiencies or excesses, has concerned us since analysis of leaf ash from "sudden death" trees indicated a

deficiency of Boron. In one small observational trial, groups of mature trees and saplings were treated with boric acid. The saplings showed signs of excess but recovered. Mature trees seemed to show temporary and ill-defined symptoms of excess. Of certain mature trees situated in a "sudden death" area, half have died within 12 months of application indicating that Boron treatment does not appear to arrest "sudden death".

Later in the year applications of salts of other minor elements were made to beds of clove seedlings but no visual signs of excesses were noticed. Potted clove seedlings are also being treated with minor elements at various levels in order to study excess symptoms in the first instance.

A suggestion that if "sudden death" is caused by a virus it might be inoculated from a diseased to a healthy tree by means of the "Kirukia" parasite (*Loranthus* Sp.) was tested at Kizimbani this year but, so far, it has not been found possible, artificially, to graft the parasite on to a new host.

The main activities in clove experimentation, however, have been directed towards the problem of regenerating, with young cloves, old clove land on which the trees have died or are dying. In the early field experiments at Kizimbani the practice was invariably to clear fell the land and remove all old clove stumps and large roots. It was later realized that the clear felling caused great ecological changes in the soil, notably an increase in termite activity, and that replanting was best done with as little disturbance of normal conditions as possible i.e. by underplanting the dead and dying old clove trees.

This method of regeneration is based on the assumption that the "sudden death" condition is not caused by a specific organism and so is not transmissible from old trees to young transplants. It is recognized, however, that land which has borne cloves for more than half a century will probably need amelioration by manurial and cultural treatments, and experiments to determine this are in progress.

A trial involving the manuring of young cloves planted in 1935, on land which had been cropped for many years previously has now yielded significant results. The manures were applied in 1937 and bearing commenced in the 1939-40 season. With the assistance of the Statistical Department of Rothamsted the yields to-date have been analysed and show that nitrogen and potash separately both give significant increases in yield although there is no significant interaction between them when applied together. Phosphates appear to have a slightly depressing effect. The increased yield and return due to nitrogen does not equal the cost of the manure applied to-date but as the trees are not yet in full bearing it is confidently hoped that in a few years time the greater yields will more than pay for the cost of the manuring. A more detailed account of the trial will be given at the conclusion of a further year or two of crop production.

Of a number of clove trees the oil contents of the produce of which were tested in 1938, several trees were selected as representing low, medium, and high, oil contents on the 1938 examination and cloves from these trees were tested again this year. The same relative oil content was observed as in 1938 and there is thus some indication that although oil content in cloves can vary over quite a large range, this character is relatively constant for the single tree.

The data on three trees for the two tests is shown below.

Tree	Oil %	Moisture %	Eugenol %	R. Index 20.°c.
Analysis of 1938 :				
119 (low)	17.60	10.0	92.0	1.5301
224 (medium)	18.93	10.0	90.5	1.5313
253 (high)	20.47	10.4	95.0	1.5318
Analysis of 1942 :				
119	15.93	12.0	91.0	1.5292
224	18.70	12.4	91.5	1.5302
253	19.40	8.8	92.0	1.5294

For some years a systematic attempt has been made to induce, by pruning, a dwarfed type of clove tree. This was done in order to ascertain if the clove tree could be kept in such a form and of such a size as would enable picking of the crop to be performed easily. Pruning was done by the removal of the upper part of the plant and the upper twigs from the lower branches. Young trees treated in this fashion were pruned to the extent of one-third, one-half and two-thirds of their natural growth. Many of the more drastically pruned trees succumbed to the treatment, losses being roughly proportional to the extent of pruning. Removal of the upper part of the tree is followed by the production of numerous small branches which grow vertically upwards from the centre of the tree giving the appearance, above the flat pruned surface, of a garden broom and this type of response to pruning is repeated each time the tree is cut.

At the end of the trial, which has now been wound up, the control trees are in bearing. Those of which one-third was removed show a few bearers while the more heavily pruned are not bearing and are stunted and yellow in appearance.

It may be concluded that the habit of the clove tree to grow in a vertical direction is very strong, that it cannot be overcome by pruning, and that such treatment leads to hindered development and delayed bearing and may result in the death of the tree.

A trial under nursery conditions in which clove plants are being raised from seeds and the nursery beds treated with various mixtures of inorganic fertilisers was continued and the first thinnings made from the beds. In this trial the response to the manurial treatments will be measured by weighing the aerial parts of seedlings dried to constant weight. It is anticipated that the trial will last at least three years the nursery beds being thinned systematically during the period. A manurial trial involving the use of organic manures and using the same lay-out as that employed with the inorganic manures was commenced during the year.

Coconuts.—Individual records of nut yield continued to be taken from 600 palms, and nuts from 26 selected parent trees were set in nurseries.

Export standards for coconut oil which were laid down during the period in agreement with Tanganyika Territory were as follows:—

East African Edible Coconut Oil.—Pure coconut oil which has not been deodorised but which has been filtered or otherwise clarified and contains not more than 0.25 per cent of moisture, not more than 0.02 per cent of matter insoluble in petroleum ether, is free from excessive rancidity and has an acid value not exceeding six.

East African Industrial Coconut Oil.—Pure coconut oil containing not more than one per cent of moisture, not more than one per cent of matter insoluble in petroleum ether, is free from excessive rancidity and has an acid value not exceeding 25.

Pineapples.—An article entitled “Pineapple Experiments in Zanzibar” by Messrs. A. K. Briant and G. E. Tidbury, Agricultural Officers, was published in the East African Agricultural Journal. The article records the results of two seasonal years of cropping. The spacing and manurial trials which were reported in the paper mentioned above were continued and the results of the season 1941/42 analysed.

Regarding the manurial experiment, the well marked effects of Sulphate of Ammonia in causing increases in (1) the number of pines reaped per acre, (2) the total weight of fruit reaped and (3) the average weight of fruit which were manifest in the first two seasons of the experiment were not found for the 1941/42 season. Sulphate of Ammonia actually caused a significant reduction in number of pines per acre although the nitrogenous manure still caused a significant increase in average weight of fruit as in the first two seasons.

RESULTS : SEASON 1941/42.

Fruits per acre.	Weight of fruits per acre	Average weight of pines (lbs.)
Treatment	(tons)	
N.	1550	4.13
P.	1837	4.31
K.	1873	4.46
N.P.	1326	3.26
N.K.	1452	4.32
P.K.	2052	4.95
N.P.K.	1604	4.35
Control	1819	4.15

The spacing experiment which is in its third season gave similar results to those of the first two years although the general production was very much lower as was seen also in the manurial trial.

Espacement	Fruits per acre	Weight of fruits per acre (tons)	Average weight of pines (lbs.)
Wide	857	2.04	5.24
Medium	2325	5.79	5.30
Close	3162	7.03	4.88
Difference required for 5% significance	975	2.39	Insignificant.

Oil Palms.—The block of Deli Oil Palms planted in 1936 is now bearing well and during the year expression of oil on an experimental scale was done, the oil being supplied to hospitals. An extension of the block was planted up in the main rains.

The oil press is of a hand type and the best results have been obtained by boiling fresh fruit overnight, mashing the boiled fruit in a mortar and then expressing the oil from the mashed fruit in the press. After the first pressing the mass is removed from the press and the kernels removed from the pulp which is reheated and pressed a second time. The oil is boiled and skimmed until free from water and sludge. The method produces an oil of good appearance. The determination of acidity, expressed as oleic acid, on oil from fruits which had been harvested

10 days before preparation gave a figure of 9.49 per cent and on oil from fresh fruit a figure of 7.68 per cent.

From the year's harvest the following figures, which are of interest, were obtained:—

Number of trees in block :	362 (70 not bearing).
Number of bunches harvested :	1068.
Average weight of bunch :	15.8 lbs.
Average weight of fruit per bunch	10.5 lbs.
Average weight of oil per bunch :	1.01 lbs.

Papain.—Two successful methods of obtaining papain from tapping young fruits of pawpaws were developed this year. The first consisted of spreading the fresh fluid on to sheets of glass and either drying in the shade or sun. The dry powder could then be scraped cleanly from the glass with a knife. The second method consisted of allowing the milk to coagulate in a glass vessel to which was added a few drops of formalin to check fungal growth. On coagulation the jelly like mass was forced through the holes in a sheet of perforated zinc into a form resembling vermicelli. This was dried on large sheets of cotton cloth tacked to wooden frames.

The Pathologist, Medical Department, who tested some of the product which was eight months old, reported: "The estimation of enzyme activity had been made by taking a measured weight of the crude papain, suspending in water with excess of coagulated animal muscle protein and determining the total nitrogen in solution after the lapse of a definite time and at a definite temperature. The first results are:—

1. Sun-dried papain dissolves 390 times its weight
2. Shade-dried papain dissolves 420 times its weight
3. Formalin-treated papain dissolves 470 times its weight

These figures are for six hours digestion at 60°C. The papain has been kept for eight months and appears to have kept well. One of the small tubes of formalin-treated enzyme had deteriorated and was not used in the test. All three samples contain a proportion of insoluble matter, so that if the pure enzyme were used the weights of protein dissolved would be distinctly higher. So far as these results go there appears to be nothing to choose between sun and shade dried products and the formalin-treated is slightly better or else has slightly better keeping qualities".

Citrus.—The majority of grape fruit and orange trees in the block are now bearing well and the crop from all trees was graded and sampled for flavour. There is a considerable variation amongst the trees and a proportion which are of a poor type will be removed.

Kapok.—Kapok was harvested as usual from selected trees. In all cases the pods open readily compared with the local type.

Derris.—The crop continues to do well and the area was extended.

Rice.—From three variety trials, using Afaa rice as the control, 10 promising varieties were selected for carrying into trials in 1943, and from a series of progeny rows sown from single panicle selections a number were chosen for further trial.

Other Grains.—Trials were continued with several maize varieties the largest yielder being White Maratha. A promising Sorghum named Keubera from Tanganyika Territory which yielded well in the main rains will be multiplied.

Cassava.—A variety trial planted in early 1941 was harvested with the following results:

Variety.	Yield per acre. tons	Difference required for 5% significance.
Msitu	8.0	1.17 tons.
Kru	4.1	
Ankrah	5.2	
F.279	6.3	
M.3	1.4	
M.13	4.2	
Mpezaze	4.1	

The varieties Msitu and F.279 were retained, the others discarded. The former is of local origin, the latter from Java.

The search for new varieties of cassava immune or resistant to the common local virus infections was continued. Several thousand seedlings were produced from seeds derived from the varieties Msitu and F.279. Seedlings planted last year were harvested and three cuttings from each selected plant were set for further examination in 1943. It has been ascertained that the characters of cassava plants grown from seeds and those of plants derived from cuttings taken from the seedlings are often markedly different. Five hundred new selections reproduced vegetatively are being grown in sets of three plants each, a selection being discarded immediately mosaic symptoms appear. When mature, each selection will be harvested, weighed and tasted and any outstanding plant multiplied for carrying into a variety trial containing the variety Msitu which has become the local standard control.

Miscellaneous.—Yams and sweet potatoes continued to be grown on the station and considerable quantities were issued for planting. The cluster bean (*Cyamopsis psoralioides*) was on trial and gives great promise as a valuable addition to our local food crops.

Poultry.—Rhode Island Red Fowls continued to be kept for distribution of setting eggs and stock poultry to the public. Over 2,000 eggs, 208 cockerels and 193 pullets were sold. Of the cockerels 183 were issued free to peasants in certain limited areas on the condition that inferior types of cockerels in their possession would be killed off.

VETERINARY.

Additions were made to the herd of cattle maintained at the stock farm by the purchase of some additional stock of the local type and the herd at the end of the year consisted of 1 bull, 26 cows, 14 heifers, 17 heifer calves and 15 bull calves. During the year under review 24 calves were born, removed from their dams at birth, and hand fed. Six cows which gave poor lactations were discarded. Of the foundation stock the cows purchased from the Ngong herd are heavier milkers than the local stock, but several of the local animals promise well.

During the year Mr. H. J. Lowe, head of the Department of Veterinary Services, Tanganyika Territory, visited the Protectorate and reported on the live stock position. As a result of his support a grant was obtained under the Colonial Development and Welfare Act for an expansion of the scope of the stock farm.

Outbreaks of the following conditions were recorded by the Veterinary Officer during the period:—Anthrax in cattle, Contagious Pleuropneumonia of goats and sheep, Foot-rot of sheep.

Helminthiasis in calves. Piroplasmosis in cattle. Three-day sickness in cattle, Trypanosomiasis in cattle, Tuberculosis in cattle.

Anthrax was confined to a single case, 200 cattle in the neighbourhood being treated with spore vaccine.

Contagious Pleuro-pneumonia broke out in one limited area but was kept from spreading by isolating the area and slaughtering the affected animals.

Helminthiasis in calves due to *Hæmonchus contortus* was treated successfully by the use of a one per cent solution of copper sulphate administered orally.

Trypanosomiasis in cattle is of infrequent occurrence and the extent of infection variable. One hundred cases were treated during the year, 122 with tartar emetic and 78 with Stibophen. In the latter case four injections, each of approximately 40 c.c., were given.

Tuberculosis lesions were detected in several carcasses in the abattoir in Zanzibar Town and tests were being given to the dairy herds in Mtoni at the end of the year.

A record was kept, so far as was possible, of the number of local cattle slaughtered in the main villages of Pemba during the year. The number was 1,036 composed of 228 cows, 738 bulls or bullocks, 35 heifer and 35 bull calves.

CHEMICAL LABORATORY.

The Government Chemist continued to be seconded to the Secretariat throughout the year, but was able to direct and supervise the work of the Laboratory and to undertake toxicological and other special examinations. The routine work was carried out very ably by the Laboratory Assistant.

The number of samples constituted a record, being 2,458 (against 1,085 in 1941 and the previous highest 1,698 in 1931). Of these 2,445 were from Government Departments (Agriculture 2,357, Health and Medical 17, Police 65, Customs 6), four from the Clove Growers Association and nine from private firms. The increase was accounted for by more frequent tests in connexion with the investigation of the development of acidity in stored cloves (1,588 samples), a larger number of soil samples (210) and the introduction towards the end of the year of export inspection of coconut oil (332 samples). The latter is an important development.

Clove oil exports involved 94 samples, representing just over 222 tons, compared with 196 tons in 1941. The average eugenol content of clove stem oil was 92.6 per cent.

Regular examination of the Zanzibar Public Water Supply gave uniform and very satisfactory results.

The Laboratory made up and issued to the District Administration 12,750 sodium arsenite baits for poisoning wild pig.

SECTION III.

LEGISLATIVE CHANGES AFFECTING AGRICULTURAL INDUSTRIES.

Reference No.	Title.	Date of Introduction.
Govt. Notice No. 44	The Agricultural Produce (Amendment) Rules, 1942	... 11-2-42

Decree No. 12 of 1942	A Decree to Amend the Diseases of Animals Decree	... 11-7-42
Govt. Notice No. 203	The Diseases of Animals (Amendment) Rules, 1942	... 29-7-42
Govt. Notice No. 44	Makes a formal amendment to the Agricultural Produce Decree, 1937, enabling a reduction in the fee for a produce dealer's licence to be made.	
Decree No. 12 of 1942 (Cap. 128)	Amends the Diseases of Animals Decree by making it possible to enforce reporting the death of live stock and the taking of adequate measures for the disposal of carcasses of dead animals.	
Govt. Notice No. 203	These Rules made under Section 20 of the Diseases of Animals Decree (Cap. 128) make it compulsory for the death of cattle, donkeys and camels within the boundaries of Zanzibar Town to be reported within a specified time, and make further provision for the burying intact of animals which have died outside the Town boundaries.	

Under the Emergency Powers (Defence) Acts, 1939, and 1940, a series of Regulations was published with the general objects of stimulating and increasing the production of food crops and requisitioning land for these purposes. A general account of the operations conducted under these Regulations has been given in Section I of the report. Hereunder a reference to the more important of the specific Regulations is given.

Reference No.	Title.	Date of Introduction.
Govt. Notice No. 11	The Defence (Land Requisition and Personal Service) Regulations, 1942	... 8-1-42
Govt. Notice No. 92	The Defence (Land Requisition and Personal Service) (Amendment) Regulations, 1942	... 13-4-42
Govt. Notice No. 278	The Defence (Land Requisition and Personal Service) (Amendment No. 2) Regulations, 1942	... 3-11-42
Govt. Notice No. 279	The Defence (Land Requisition and Personal Service) Regulations, 1942, Specified Areas	... 3-11-42
Govt. Notice No. 130	The Defence (Registration of Adult Male Persons) Regulations, 1942	... 23-5-42

ACKNOWLEDGMENTS.

It is not possible to make more than a reference to the management of the Government Plantations, the activities of the Produce Inspectorate or the upkeep of the Town Avenues and open spaces for the period under review. All these activities were fully maintained.

I wish, however, to acknowledge very gratefully the good and willing work of all members of my staff during the year. Almost every man has been performing some war time duty in addition to his normal work.

J. C. MUIR,
Director of Agriculture.

